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# RESEARCH ARTICLES

## Technically Speaking: On Equipping and Evaluating “Unnatural” Language Learners

Joshua Reno

**ABSTRACT** This article compares different communicative trials for apes in captivity and children with autism in order to investigate how ideological assumptions about linguistic agency and impairment are constructed and challenged in practice. To the extent that Euro-American techniques of “unnatural” language instruction developed during the Cold War era have been successful, it is because communicative interactions are broken down into basic components and would-be language learners are equipped with materials, devices and habits that make up for their distinct bio/social deficits. Such linguistic equipment can present a challenge to the ideological presumption of a subject inherently gifted with the rudiments of talk, that is, the human as naturally speaking. However, this ideology can reassert itself if the active contribution of unnatural language learners to their technoscientific trials is downplayed. In order to counter this tendency, I propose that speech acts be reimagined as part of a more encompassing semiotic ensemble. [*language development, semiotics, materiality, posthumanism, linguistic ideology*]

### INTRODUCTION

It is a mid morning meeting in a trailer adjoining a South London primary school. We are visitors to a “special school” for children with autism spectrum conditions, our children. As they begin classes for the day, we consume tea and biscuits and discuss strategies for developing life skills and coping with everyday challenges. The composition of the morning group changes month to month, but like the school population as a whole is typically a mix of lifelong Londoners and recent immigrants, predominantly from West Africa and the Caribbean. Despite our obvious differences, we recount strikingly similar experiences raising children with social, linguistic, and cognitive impairments in the United Kingdom.

At one point, the group leader—a special needs consultant to the school—mentions the Picture Exchange Communication System (“PECS”), so-called because it recasts interpersonal communication as a form of reciprocal trade, substituting the “exchange of words” with the exchange of visual icons. Reactions are characteristically mixed. PECS is one of few developmental tools thought by special needs practitioners to have a reliable “evidence base”; consequently, it is frequently introduced at training sessions and meetings like this one. Most of us became aware of PECS shortly after receiving a diagnosis and, by the time our children began school, had already tried it. My wife and I had

been using PECS with our son Charlie for two years, but not consistently. Several parents confess that they had stopped using it altogether. One person attributes this to their child losing interest, but a few mothers offer different reasons. They express concern that signing with objects will actually hinder development. If their child is nonverbal, they worry PECS will impede speech acquisition; if they are verbal, their parents worry that they will regress.

Behind these anxieties is a linear vision of child development that parents and carers of people on the autism spectrum know well, a sense that our children are “behind” or “delayed”—“two steps forward, three steps back” as morning group members sometimes say. The parents that spoke up about their concerns, concerns that many morning group attendees recognized, voiced an understanding of normal language development as involving a movement away from the manipulation of external objects and toward independently produced, internalized speech acts. This is a culturally particular model of language learning shared by developmental specialists throughout the United Kingdom and elsewhere, who gauge the utility of communicative aids like PECS based on whether or not they will lead to full speech.

In this article, I consider contemporary technoscientific trials such as PECS, which were designed for impaired language learners, including children on the autism spectrum

and apes in captivity. I focus in particular on the ways their semiotic development is shaped by and potentially challenges normative assumptions surrounding who speaks and how.

Like many other assistive and augmentative communication devices, PECS relies on the objectification of communicative prowess. Indeed, some speech therapists refer to the PECS binder, with its store of small picture symbols, as the child's actual "voice." In so doing, I argue, they unsettle the pervasive ideological model of the naturally speaking human subject. Unequipped, save for their "internal" talents, the cultural figure of the naturally speaking subject lurks behind depictions of linguistic action and the human condition generally. The very idea of language "acquisition" implies that speech is something owned, a property that we comfortably possess, rather than a skill that most, but not all, are equipped for, which requires practice and may involve lifelong struggle. But what happens when a language user lacks the biophysical and/or social resources that are thought necessary for linguistic competence? Can they ever become a fully fledged linguistic agent? I consider situations where an artificial platform of materials, devices, and habits makes up for seemingly "internal" deficits, thereby enabling forms of linguistic or protolinguistic skill. I describe these assistive forms as linguistic equipment in order to highlight the distributed nature of sociocognitive competencies (Cowley 2003, 2007; Everett 2012) and to question the idea that an instinct for communicative interaction is ever internalized to such a degree that it cannot be lost or suppressed.

Based on experiences with PECS I observed in London workshops, schools, parent group meetings and in my own home, and in juxtaposition to the unnatural language learning of nonhuman apes, I conclude that breaking down communicative interaction into objectual forms can afford new opportunities for semiotic development. At the same time, if the active contribution of impaired learners is downplayed, or if the role of their more skilled instructors is overemphasized, experiments at the ideological boundaries of communicative competence may not appear to transform unnatural learners into full-fledged linguistic actors at all but, rather, reassert the gap that separates them. Insofar as unnatural language learning involves, not only conspicuous linguistic equipment but also additional interlocutors to facilitate its use, in fact, it may serve to perform new figurations of the naturally speaking subject. The tensions surrounding this ideology are apparent not only in face-to-face meetings with parents and practitioners but also in the wider debates within the health and human sciences surrounding children with autism and nonhuman apes, where different experimental trials are thought to reveal their natures.

The delicacy of linguistic competencies becomes apparent when normative definitions of the human are challenged by different forms of impairment. Scholars in disability studies have documented how, historically and in the present day, the differently equipped bodies of disabled persons are denied the recognition of being fully human

(Albrecht et al. 2001; Davis 2005; Mitchell and Snyder 1997). This form of prejudice is especially acute, arguably, when that impairment manifests linguistically and disabled persons lack a recognized "voice" to speak on their own behalf. My own interest in impaired communication began when my wife and I realized our son Charlie was not learning to speak. Typically autism spectrum conditions are identified with reference to three bundled traits: complications with language development, difficulty with social relations and situations, and a desire for sameness and repetition. The precise origins of these traits are not clear, nor how it is that they manifest so differently in different people, but it makes sense that a person experiencing social and behavioral irregularities would also find linguistic interaction difficult. According to long-term studies, between one third and two thirds of those diagnosed with autism spectrum conditions "never acquire useful spoken language" (Carr and Felce 2007:780).<sup>1</sup>

Over the last several decades, the popular and contested trope of "alienness" has spread as a way of accounting for this gap between people on the spectrum and the so-called "neuro-typicals" that surround them. Ian Hacking (2009) reviews the role of the alien metaphor in fiction, activism, and personal narratives, arguing that it is based on mutual nonrecognition, exacerbated by the social impairments that people with ASD experience: difficulty attending to social cues, interpreting the motives of others, and engaging in normative forms of thought and behavior. More than that, Hacking argues that the alien metaphor stands for the absence of a "bedrock" of a "shared form of life"; without this an "artificial platform must be constructed" to enable mutual understanding across this divide (2009:56).

Some of those on the spectrum may rely on conspicuous, sometimes controversial material platforms to speak, including PECS, iPads, robots and dogs (Dautenhahn and Werry 2004; Solomon 2010). Those without the ability to speak or write are unlikely to be recognized in public debates about their condition, its causes and effects, or proposed medical interventions and "cures." They will thus be less able to contribute to the public construction of autism as a form of disease or identity, crisis or human possibility (see Nadesan 2005). In this respect, they challenge not only the accepted format for the public inclusion of difference in multicultural democracies (Bumiller 2008) but also anthropological characterizations of human beings as essentially self-expressive and reflexive creatures. I trust most anthropologists would hesitate before labeling people on the spectrum "inhuman," but others are not so reluctant. Several recent studies have attempted to categorize "autistic children" as closer to chimpanzees or robots than human beings, on the grounds that they lack the ability to learn "culture" or understand other people's intentions (see Gernsbacher 2007). Although highly controversial, such claims are bolstered by the difficulties that people on the spectrum often demonstrate with speech and social interaction.

And yet, if one attends to the unique communicative strategies of nonverbal people, simple accounts of communicative “incompetence” are called into question (Ochs et al. 2005:567). In Charlie’s case, for examples, a repertoire of communicative signals help him coconstruct meaningful interactions with others in place of formal language. I would characterize these various idiosyncratic communication strategies as home signing. Home sign systems are “ad hoc” and “developed to meet an individual’s or a small group’s needs for communicating” (Senghas and Monaghan 2002:75). Although typically used to describe the signing practices of people who are medically deaf, in principle “home signing” can also be used to describe the unique semiotic idiolects that autistic and other learning-disabled persons develop.<sup>2</sup>

It is in deference to the idiosyncrasy of home signing that I have not written an article about “autism” generalizing exclusively from my experiences with my son. In this way I adhere to a maxim, popular among people in the diverse and contested autism spectrum community: “if you know one autistic person . . . you know one autistic person.” Although the home signing practices of people on the spectrum vary considerably, my investigation is inspired also by encounters with other parents from South London who share many of the same concerns about their children, especially their linguistic development.

Linguistic impairment has become a topic of interest for psycho- and sociolinguists and linguistic anthropologists in recent years, in part because abnormal language development demonstrates the resilience of language learners (Goldin-Meadow 2003), and the socially embedded coconstruction of meaningful interaction generally. In some ways, this was prefigured by explorations into the early stages of language development (Haviland 1998; Ochs and Schieffelin 1996). Just as the communicative limitations of infants and toddlers do not prevent them from contributing to participant interactions, impaired speakers can overcome various “internal” obstacles and deficits in the course of communicative interaction, including aphasia (Goodwin 2000, 2004), autism spectrum conditions (Ochs et al. 2004; Ochs et al. 2005) and medical deafness (Hoffmann-Dilloway 2011; Levinson 2006; Senghas and Monaghan 2002).

These investigations reveal linguistic competence as a collective achievement, rather than a natural guarantee. At the same time, the documentation of such cases may presuppose and entail the projection of a naturally speaking subject, a being lurking beneath the impairment who, by virtue of their humanity and biology, is driven to communicate.<sup>3</sup> Brian Keith Axel (2006) describes this as an aspect of a “modern linguistic ideology” unwittingly propagated since the Cold War, which conceives of the human “as a naturally speaking being and as the material and corporeal origin and agent of communication” (2006:356–357). As a consequence of this assumption, the human body is fetishized as the “place of origin of communication in the form of speech”

and when technologies of communication are objectified into linguistic equipment, they are taken to be mere “instruments of prosthesis” (Axel 2006:373). If linguistic actors appear to be the instruments of their prostheses, and not the other way around, their “natural” ability and desire to communicate is placed in doubt and their cultural figuration as one who speaks is compromised.

It is interesting to reflect on ideologies of communication related to the naturally speaking human in light of the prominence of so-called “posthuman” theoretical approaches. As Latour suggests, being able to “speak” is often thought to be the *sine qua non* for recognition as a legitimate agent (2004:66). If there is a skill that sustains an attachment to human narcissism, it is language. The apparent effortlessness with which most infants develop language not only maintains anthropocentric attitudes but also can also obscure the interactional basis of speech, as do the “internalist” theories of language acquisition associated with Noam Chomsky and Steven Pinker (see Cowley 2006).

Precisely because ideological conceptions of language are so deeply rooted in the projects of modernity (Bauman and Briggs 2003), Christianity (Keane 2007) and the nation (Anderson 1991; Warner 1990) investigating sites where the boundaries of the human–nonhuman are being linguistically redefined can reveal politically and morally evocative tensions. In an approach that parallels Axel’s, Webb Keane argues that interpretations of language use are mediated by semiotic ideologies: “basic assumptions about what signs are and how they function in the world” (2003:419). Such ideologies would include assumptions about what sorts of being are likely to speak and how. The technoscientific trials of semiotic engineering that interest me here, for example, share an implicit secular materialism: it is seen as reasonable that nonhuman animals or even artificial life forms might learn language, regardless of their particular socio/genetic deficits, but that otherworldly or spiritual beings might “speak” is deemed inadmissible.

Exploring the tensions and controversies that surround nonhuman language development also illuminates those associated with PECS and other assistive and augmentative communication devices. In keeping with the insights of Ochs et al. (2005) and Ochs and Solomon (2010), derived from their *Ethnography of Autism* project, I discuss how linguistic equipment can potentially conform Euro-American interactional styles to the idiosyncratic competencies of impaired speakers, even as they expose ideologies of communication concerning what counts as a fully fledged linguistic actor.

## LANGUAGE AND TECHNICS

Resemblances between the linguistic trials of disabled persons and nonhuman apes are not accidental, but are directly motivated by and embroiled within a particular epistemological tradition of the human sciences that I characterize as “mechanistic.”<sup>4</sup> Recent genealogies, Axel’s among them, have called attention to the influence that U.S. government



and military sponsorship had on human sciences prior to and during the Cold War, and the importance of the parallel wartime intellectual projects of behaviorism and cybernetics, both of which incorporated terms and tools from engineering in an attempt to bridge the social and natural sciences (see Boyer 2010; Price 2008). Both approaches were highly influential, partly because they shared a focus on the rationalization and control of human and nonhuman systems, conceived as machinelike relays for inputs and outputs of observable stimuli and information.<sup>5</sup>

For the technoscientific trials that arise from these epistemological traditions, PECS among them, impaired language learners represent a problem for semiotic reengineering. According to Mara Mills (2010), disabled persons were crucial in the development of Euro-American mechanistic epistemologies from the 19th-century onward. In the 1940s, for example, medically deaf people played a critical role in the development of speech wave visualization, ultimately contributing to the growth of telecommunications and cybernetic theories of signal transmission. Keating and Mirus (2003) describe similar trials involving contemporary mass media, as members of the linguistically “Deaf” community (as opposed to the medically “deaf”) innovate new forms of linguistic practice through their use of information and communication technology and, in so doing, redefine the interactional parameters of the internet.

My own focus is not the innovation of new communication epistemologies or technologies, but the moral and ideological implications that surround “who speaks” in contemporary linguistic encounters involving established sociotechnical ensembles and seemingly “unnatural” language learners. The value of behaviorist and cybernetic perspectives for such linguistic experimentation is that they allow teachers to ignore the “black box” of the subject, whatever its “internal” deficits may be. Instead communicative interactions are broken down into observable and manipulable patterns of stimulus and response, input and output, which are not only easier to teach but also to test.

One can usefully compare this model of semiotic engineering to the famous Turing Test. Logician and mathematician Alan Turing proposed one of the first experiments involving human–nonhuman communication as a method of evaluating artificial intelligence (AI). Although ostensibly testing to see whether a machine could fool a human by mimicking one, Turing’s proposal—which would guide AI research for decades—began with assumption that the ability to converse distinguishes an actor one cannot see as identifiably human. In a way, Turing’s thought experiment was a commentary on humanness appropriate for the burgeoning era of global telecommunications, where instantaneous contact had to be reconciled with an existing culture of discursive interaction. As N. Katherine Hayles (1999) notes, the Turing Test offered a cybernetic vision: when something as distinctly human as interpersonal dialogue can be distilled from its bodily enactment and duplicated in digital code, it is not just that computers are elevated to AI, human bodies

are revealed to be no more than incidental media for the transmission of messages.<sup>6</sup>

Rather than claim the posthuman loss of an analogue subject to digital circuitry, however, I would argue that insofar as the Turing Test makes a linguistically competent human the ultimate judge of the computer’s imitation, the communicative exceptionalism of the former is digitally reaffirmed. Indeed the problem with such scaled down communicative interaction is that, useful as it is for the AI mimic, it cannot ultimately fool the human judge. Like the Turing Test, other forms of technically mediated, scaled down semiosis consistently raise doubts as to who is really speaking.

By describing semiotic reengineering as “scaled-down,” I do not mean to caricature gestural or technically mediated communication as a more primitive form of semiosis. This is the case in “gesture first” theories of language evolution, for example, which hold that gesture is a less developed semiotic practice, one that was likely used by our common great ape ancestor and gradually evolved into natural human language (Corballis 2003). One can detect in this argument similar assumptions about language development as are voiced by some parents and carers of disabled people described above. As with uneasiness with a communicative aid like PECS, some evolutionary accounts reflect a presumed hierarchy of semiotic forms, with externally manifest, material expressions like gesture at the bottom and internally present, mental entities like grammar at the top.

Even if one were to set aside the complete grammars of human sign languages, it is inaccurate to separate gesture as a less developed form of verbal language. Many scholars of nonverbal communication recognize an indivisible unity of gesture and speech (see McNeill 1996; Streeck, Goodwin and LeBaron 2011). As David McNeill et al. (2008) and others argue, gestural acts cannot be parsed out as less complex or “pre-linguistic” forms in order to explain language; rather, the entirety of communication is what needs explaining. I would go further and suggest that the growth of human gesture, and therefore language, has to be understood alongside the development of a wider ensemble of technical form and practice.

According to André Leroi-Gourhan, “techniques involve both gestures and tools, sequentially organized by means of a ‘syntax’ that impart both fixity and flexibility to the series of operations involved.” (1993:114). Thus, the technics of early humans and industrial societies cannot be understood apart from the gestural activities or “operational sequences” of which they are the material precipitate. Following Leroi-Gourhan, language must be reconsidered as technical and gestural, and technology must be more broadly cast as semiotic practice. Because technological forms spread well beyond the immediacy of face-to-face interactions, however, there is a pervasive tendency to separate technology from language as two interconnected but relatively autonomous social fields.

Consider one of the rarely discussed origin stories of Actor-Network Theory. Based on collaborations with

primatologist Shirley Strum, Latour suggests that face-to-face interaction cannot account for the durability and complicatedness of the societies that humans construct (Callon and Latour 1981). Baboons might establish their societies from scratch, through constant negotiation of complex local hierarchies, but with humans it is different: “the basic social skills, although still present, offer [a] restricted repertoire. Most of the far-reaching and long-lasting associations are made by something else” (Latour 2005:65). This “something else” is the material “equipment” through which human societies are made durable, without which they would still be “complex”—just as baboon groups are—but far less complicated (2005:197).

Another way of accounting for the boundary between complicatedness and complexity is with reference to language. As Marilyn Strathern (n.d.) argues in a recent paper, which engages with Latour et al.’s baboon story, the Tor communities of Western Papua New Guinea may have once had very little in the way of material culture, but still managed to “multiply” themselves, and introduce further complication in their day to day lives, through their use of intricate kin terminology.<sup>7</sup> Indeed, by dismissing “face to face” interaction, Latour et al. fail to note the enduring social forms and cultural values generated out of the reflexive pragmatics of talk (see Silverstein 2003; Silverstein and Urban 1996). Generally speaking, this is in keeping with the social study of science and technology, where talk is rarely acknowledged as a special form of material practice. Where language is given a role, it is as one form of representation among many, alongside photographs, diagrams and other “inscriptions” (see Latour 1987; Lynch and Woolgar 1990).<sup>8</sup>

At the same time, there is something intriguing about the idea that it is not only language but also “equipment” that separates humans from nonhumans. If technics are regarded in the sense that Leroi-Gourhan encouraged, then it is possible to recognize distinctively human communication as part of a larger semiotic ensemble that includes gesture, speech, and material technics, excluding none as prior or primitive. As Latour writes, “no beings, not even humans, speak on their own, but always through something or someone else” (2004:68). If all of us are so equipped, regardless of real and perceived deficits, with such an ensemble, we also equip each other to speak. Indeed, we are each other’s linguistic equipment.

### PRIMATES FACE TO FACE

During the Cold War there was a flurry of interest in primatology involving experiments with transspecies communication and sociality, both in the lab and in the wild. The use of trained nonhuman primates in the space race is well known. The reason similar experiments spread throughout mainstream and popular science in the late 20th century, Donna Haraway argues, is that at a time when anxieties were growing about the denaturalization of humankind and the destruction of nature, primatology offered redemptive narratives that placed “animals just at or over the line into

‘culture’” and people “at or over the line into ‘nature’” (1989:148).

Tool using and gesturing great apes are our closest genetic relatives and seem to possess some of the same affinities for social interaction. Over the last half-century, many have wondered why it is, then, that chimpanzees, gorillas, and orangutans do not talk and, more precisely, what it means that we alone among primates do. The simplest explanation is that they lack the biocognitive resources to produce complex vocalizations, learn and remember subtle linguistic rules, and achieve symbolic understanding (Deacon 1997). Of course it could also be said that neither do apes in the wild have people using language around them at the critical age when they might learn linguistic skills; when they do it is usually as captives (see Cowley 2005). More to the point, what appears from an idealized anthropocentric model of communicative competence as biological limitation could also be seen as affordances for alternative forms of semiotic practice.

Two of the most accomplished and well-known “linguistic” apes are Koko the gorilla and Kanzi the bonobo chimpanzee. Both have been trained to use signs through behavioral conditioning methods, including positive reinforcement most centrally. The benefit of this method is that it allows teachers to ignore the black box of the animal subject, its “internal” deficits, and instead break down semiotic practice into observable and manipulable patterns of stimulus and response.

Koko was taught from a young age to form gestures based on a modified form of American Sign Language, which researcher Francine Patterson refers to as “Gorilla Sign Language” (GSL). With Patterson’s tutelage, it is said that Koko can now form over 1,000 words of sign language and understand many more spoken words of English. Critics remain skeptical of the claims surrounding Koko’s signing. They tend to query, in particular, whether a gorilla can truly comprehend the subtleties and rules of grammar “young children seem to take to without effort” (Blackmore 2000:88) or what role the ape’s interlocutors play in translating “nonsensical or unresponsive” utterances into acts of “saying” (Uddin 2006:113). The problem is not simply Koko’s apparent gorillaness, but the conspicuous coconstruction of her utterances. As indicated already, similar complications arise with the attribution of speaker roles in impaired human speech (Goodwin 2004; Hoffman-Dilloway 2011), where “incompetent” speakers are aided by, or are seen to be mirroring, the linguistic competence of another. Whether or not a fair assessment can be made of Koko’s prowess, the very orchestration of an animal’s linguistic performance, its continual documentation and narration as a wonder, serves to communicate powerful messages about the naturalness of human communication by comparison.

Inspired by these early signing experiments, Savage-Rumbaugh et al. (1980) designed a training method with chimpanzees using “lexigrams”—small rectangular signs with no inherent connection to their object of reference.



FIGURE 1. A selection of Kanzi's lexigrams (copyright the Great Ape Trust, [www.greatapetrust.org](http://www.greatapetrust.org))

These were mounted inside cages so that subjects would have access to them on a regular basis for use in chimpanzee communication. Using operant conditioning, once again, researchers attempted to teach common chimps not only to use signs individually but also in combination to approximate symbolic reference.<sup>9</sup> The studies would begin by teaching the chimps to pair lexigrams to represent particular foods, tools, and actions, which were ultimately structured to elicit an understanding of categorical distinctions of a more abstract sort between “tools,” “foods” and so on.

The initial studies had mixed success but, in a now famous accident, an immature bonobo chimpanzee named Kanzi, who had witnessed his adopted mother's language trials, showed incredible aptitude for lexigram usage and was able to achieve levels of symbolic communication his predecessors could not (Deacon 1997:125). According to the Great Ape Trust, Kanzi can now recognize over 500 words, including (like Koko) many spoken words of English (see Figure 1).

One of the most common criticisms of Savage-Rumbaugh et al.'s work is that Kanzi was only conditioned to use lexigrams, which were serving as indexes that referred to past rewards and, thus, were not “true” symbols (Seidenberg and Petitto 1987). Such “cognitive props” (Cowley 2005), the reward-based learning, the human trainers, the lexigrams, all serve as reminders of experimentally realized linguistic skills, making the animal subject seem like the prosthesis of the scientist, not an expressive being. To the extent that Koko and Kanzi offer formal “proof,” it is as trained research subjects: spoken apes, and not speaking actors. Human children seem to “absorb” words and transform them into language, author Susan Blackmore argues, whereas experimental apes “have to be coerced and rewarded

to learn just a few paltry signs” (2000:88). From this perspective, while both semiotic actors require the presence of competent interlocutors, the gifts of naturally speaking subjects allow them to internalize speech and make of it language, without the external form and force of conspicuous manipulation. Even when Savage-Rumbaugh and others defend their research, they must negotiate a tension between a standardized experimental protocol and the peculiar, accidental history of Kanzi's linguistic achievements, including his alternative biological resources as a bonobo chimp.

And yet, similar ambiguities surround ape production of unique utterances outside of formal linguistic demonstrations. Haraway makes this clear in an analysis of the popular narrative of Koko's request for and adoption of a kitten, her own animal captive to keep with her in captivity. In representations such as these, Koko is not granted the recognition of existing in a shared, coeval world where “kittens have particular resonances in European-derived industrial cultures” but serves as a cultural figure that “re-naturalize(s) ‘man’” (1989:145). In most accounts of the linguistic feats of Kanzi and Koko, scientists are not endeavoring to hybridize new great ape societies composed of humans, gorillas, and chimps but, rather, to use experiments with nonhuman talk to make claims about “the human” including the pain and longing that is thought to accompany self-understanding.

In this sense, ape language programs cannot really fail. Even if their successes are exaggerated, they generate popular narratives that offer evidence of human distinction and ape limitation. This does not remove risks for the participants involved, however. Apes trained to sign offer up a range of resonant resemblances to their human counterparts, from moments of staged desire, as with Koko's kitten, to signs of apparent sexual deviance. In 2005, Koko was accused



of sexually harassing former members of the research staff, having touched or repeatedly asked to see their nipples. Patterson, furthermore, was accused of having pressured them to do so for the sake of the project. The case was quickly settled out of court, but attracted uncharacteristically negative media attention. One Tampa Bay news article referred to Koko's alleged request as part of a "simian nipple fetish" (Benham 2005) and cites as evidence part of a transcript from a public AOL chat involving (Penny) Patterson and the gorilla in 1998:

AOL: Question: Do you like to chat with other people?

PENNY: Koko, do you like to talk to people?

KOKO: Fine nipple.

PENNY: Yes, that was her answer. "Nipple" rhymes with "people," Okay? She doesn't sign "people" per se, so she may be trying to do a "sounds like . . ." but she indicated it was "fine."

On the one hand, the presentation of the transcript, as a news item, is meant to suggest that Koko is a full participant in the dialogue, an equal party who speaks in turn, perhaps even one whose words say too much, who incriminates herself by exposing a "fetish." In this respect, the lawsuit and its public reception reveal a willingness to entertain Koko's moral copresence. On the other hand, Patterson's explanation for Koko's linguistic error (metonym? Freudian slip?) serves as a reminder that this is a mediated ape, in some ways an extension of the researcher . . . and vice versa. Depicted as partners in crime, the same tension between the two female primates is evident in other news accounts of the lawsuit, which alternate between naming Koko and Patterson as the ones held legally responsible. The fallen scientist playing god forms a perfect narrative compliment to the uplifted ape playing human.

In general, the figure of the overzealous researcher has been the primary target for critics of ape language studies. Psychologists Mark Seidenberg and Laura Petitto have raised concerns about the work of Patterson and other ape language studies by questioning the method by which ape "utterances" are meaningfully interpreted (Seidenberg and Petitto 1981). They point out that it was a maxim of early ape studies to attribute greater meaning to observed ape signs than might have been warranted, a strategy known as "rich interpretation" that was linked to the idea that captive apes should be treated like human children to encourage language uptake. Consider two tokens signed in succession. They might be linked by nothing more than their indexical connection to directly motivating objects, but could be generously interpreted as the syntactically arranged components of a sentence, because, it is assumed, a naturally developing child's utterances would be taken in this way too.

Seidenberg and Petitto are very familiar with ape language studies conducted on this principle. As graduate students they observed "Project Nim," perhaps the most controversial ape language study of the 20th century. Also the name of a celebrated recent documentary about the study and its tragic consequences, Project Nim was an effort to raise a chimpanzee, jokingly named Nim Chimpsky, as a hu-

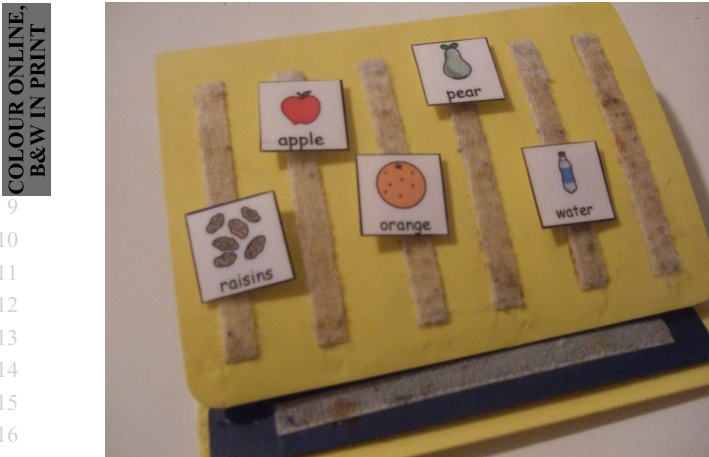
man child. It was a productive failure, because it succeeded in pointing out a possible flaw in all similar studies: the tendency to disregard the ability that experimental apes do have, which allows them to encourage the self-deception of their experimenters. In a similar way, semiotician Thomas Sebeok, another notable critic of ape language studies, likens nonhuman sign language to a form of Clever Hans trickery (see Hediger 2010). Experimenters are so intent on communicating across human–nonhuman barriers, they overinterpret animal behavior. In so doing, Sebeok would argue, they actually downplay the communicative skills that nonhuman animals do possess, notably the ability to learn what they need to do to exploit their human counterparts. The interesting conclusion is this: apes may manipulate their linguistic equipment so skillfully that it goes unnoticed by experimenters as well as their critics, all of whom remain ideologically fixated on what is going on "internally."

## AUTISM SPEAKS

Fantasies of speaking with animals or artificial life forms are not typically motivated by the same desperation and hope that lies behind attempts to establish channels of communication between nonverbal and verbal persons, and yet they are vulnerable to similar semiotic complications and uncertainties. These trials are not merely about the practicalities of communicative limits, solely, but how they are interpreted through cultural models of who speaks and how. The models that concern me can be partly traced to wartime Euro-America and have since come to shape practice and methodology in computing, primatology, education, and elsewhere. Other ideologies mediating prosthetic speech training and evaluation may rest on different grounds.

However, people with different language impairments may experience a similar social withdrawal, they may also be exposed to resources for language development that they cannot access or are not tailored to their needs (see Hoffman-Dilloway 2011; Ochs et al. 2005). One of the reasons that PECS is preferred as a method is that it does not require eye contact between the participants, only that the learner attends to the object being exchanged. Furthermore it does not involve imitation, but rewarded, goal directed behavior learned through repetition and adherence to a step-by-step approach. Rather than begin by associating word and object, the learner first learns to exchange objects for desired "motivators" (a favorite snack, a game, etc.).

In the beginning, there are usually three participants, the learner, the prompt, and the teacher. Between the learner and the teacher is the PECS book, which usually contains sheets inside which will eventually store the learner's personal collection of symbols. The prompt stands behind the learner out of sight; only the teacher speaks. To begin with, there is only one symbol on the book, a laminated square image affixed with Velcro. First the teacher presents the learner with the motivator, when the learner reaches for it the prompt guides their hand to the symbol on the PECS book and helps them hand it to the teacher. When the



**FIGURE 2.** PECS book (copyright with Michigan State University, [www.msu.edu/~toddsar2/PECS.html](http://www.msu.edu/~toddsar2/PECS.html))

teacher receives the symbol they name the motivator (e.g., “apple”) and hand it to the learner. Over time, the prompt aids the learner less and less until the action of reaching for the symbol to request the motivator is done out of habit. In order to counter the tendency to favor regularity and fixate on sameness, the learner is then encouraged to dissociate the exchange of symbols from particular people and contexts, such that they begin to generalize the practice and become more persistent with communication. Finally, in the discrimination phase, the learner begins to associate particular symbols with particular motivator. As the learner acquire familiarity with more picture–object combinations, their PECS repertoire grows into pages and pages of symbols (see Figure 2).

Like Kanzi’s lexigrams, PECS performs a link between word and object in a ritual of multiple indexical and iconic associations. The act of exchange is meant to evoke a link between the uttered word and the desired object, just as the exchange itself is meant to evoke a connection between personal enjoyment and successful social interaction. In the case of nonhuman apes as well as human people on the autistic spectrum, the preferred philosophy of linguistic enskillment is behaviorist: it depends on the identification of a stimulus and a stimulus response with a particular signal, so that a habit can develop that encourages the trainee to associate word and object. This process is mediated by their individual drive to attain some motivating end, most commonly, food. PECS trainers regularly inform parents and carers new to the practice that food is the best motivator and the most likely to reward communication with the immediacy required for the subject to build associations between objects and symbols.

Behaviorism is also the inspiration behind ABA (Applied Behavioral Analysis), which is a more comprehensive training program for people on the spectrum, employed to teach them appropriate everyday behaviors and reduce their anxiety with social interactions. Together, ABA and PECS represent the two approaches that are thought by the spe-

cial needs practitioners I spoke with to have the greatest evidentiary support. In part, this is because they can be successfully operationalized in educational and support settings, which owes much to their behaviorist step-by-step emplotment. ABA is also heavily criticized by some members of the autistic rights community, however, who accuse it of reprogramming people on the autistic spectrum to bend to social convention, rather than allowing them to develop in their own way (see Bumiller 2008).

From this perspective, the objectification of “voice” into PECS is an alienating process. PECS is not simply a way of reshaping behavior, however. It is patterned on the particular skills and impairments of people on the autistic spectrum, who are introduced to the sociality of interaction through “fixed” attentiveness on its materiality. Some studies examining the effectiveness of PECS find marked improvement in speech production (Carr and Felce 2007); but even those that do not still find evidence of an improved ability to use PECS (Howlin et al. 2007). In these cases, it may still compensate for the learner’s social impairment by offering them a practical model for how social interaction works. As my wife puts it, PECS provides Charlie with his own “economy” of objects, premised on a model of sociality as exchange. This characterization of the practice is quite fitting, because there have been times when he seems to act as if he owes us a debt for providing him with something, even when he is separated from his PECS folder, and he reaches out to exchange the nearest thing at hand.

Charlie’s use of PECS is employed as part of a distinctive semiotic repertoire of gesture and phonation to communicate with his family, friends, and carers. Charlie’s “requesting” gestural behavior is facilitated by established routines for his daily activities, which he learns to select by prompting us in various ways to attend to things in his perceptual purview. As Goodwin (2000) explains, the success of these gestures relies on their being placed in the correct sequence and context of interaction by Charlie’s interlocutors—a request to watch a video should not be confused with a request to go outside. Another, more subtle form of communication comes from Charlie’s manipulation of what Sicoli (2010:522) calls “voice register.” Although most linguists associate phonation with stylistics, Sicoli argues that nonreferential acoustic shifts are performed to index distinct speech registers in Lachixío Zapotec, giving them a more pronounced role in social performance. Without the use of what Sicoli terms “lexical registers,” Charlie employs alternations in voice to help define the parameters of his interactions with other participants and objects. He has used a low creaky voice, for example, to call for more bodily contact and “deep pressure” sensory stimulation, while a tonal, breathy voice typically indicates that he would rather focus on manipulating an external object with his hands. In these cases, Charlie’s vocal shifts help those around him to discern the best way to interact with him at that moment. Unlike his gestural communication, phonation helps him express his sensorimotor needs, which, in the case of many



people on the autism spectrum, heavily mediate engagement with others and the surrounding environment.

Charlie's use of PECS has developed alongside his distinctive vocal register and his "requesting" gestures to make up an idiosyncratic semiotic totality, a home sign system. If evaluated relative to the achievement of "real" speech, this range of communicative forms can appear quite limited, which can create the kinds of anxiety and uncertainty documented in the morning school meeting mentioned at the beginning of this article. For medically deaf Nepali home signers discussed by Hoffman-Dilloway (2011), competence is recognized even when they mimic or copy the signs of their interlocutors, quite against the standards of mainstream linguistics. For people on the autism spectrum subjected to the modern semiotic ideology of the naturally speaking subject, by contrast, competence is thought to require linguistic performance apart from the influence of other people's linguistic agency, stemming as it does from a communicative interior. It is partly for this reason that some parents of autistic children express ambivalence about the usage of PECS. The fear of contamination of speech by PECS stems from its mediating role as a material platform, which is dependent not only on external objects for the coconstruction of meaning but also the cooperative involvement of a more competent linguistic actor.

But isolating linguistic actors is not so simple. Consider the colloquial term for a learner's PECS book among practitioners: their "voice." As one PECS trainer informed me, this is meant to socialize caregivers into a new conception of language socialization, to remind them not to restrict the learner's access to the book and inadvertently suppress their communicative agency, "I keep telling them that is his voice, don't put it on the shelf out of reach!" The reason that PECS trainers feel it necessary to remind parents of this is the latter's resistance to the notion that their child's "inner" voice is dependent on disembodied linguistic equipment.

In linguistic anthropology, "voice" is understood as "the linguistic construction of social personae," which "addresses the question of 'Who is speaking?' in any stretch of discourse" (Keane 2000:271). In this understanding, "voicing contrasts" are essential because: "No figure of personhood is typifiable as a discrete voice (of whatever type) unless it is differentiable from its surround" (Agha 2005:40). The difficulty of PECS' voices, is that they threaten to become indistinguishable from their equipment, from the voices of others around them, from the surrounding world that can overstimulate and overwhelm them. It is precisely because of such boundary anxieties, about where speaking subjects end and begin, that PECS, speech generating devices and other linguistic equipment for the nonverbal remain highly controversial.

One stunning example is the debate over Facilitated Communication (FC), where an aid helps an otherwise nonverbal person to type messages by lifting their hand to a keyboard. This began to spread through the United States in the early 1990s and has since been criticized by some as a

hoax perpetuated by the will of the nonverbal subject's linguistically competent assistants (see Jacobson et al. 2005). Parents and caregivers so badly want to communicate with the "real person" locked inside disabled bodies, they are believed to bias the results of "treatment" out of desperate hope—yet another account of the naturally speaking subject, with their desire to communicate so strong, that they contaminate experimental encounters with unnatural language learners. And yet, during one discussion group at Charlie's school the adult sibling of someone on the spectrum swore to us that the use of FC had allowed her disabled brother to communicate his inner thoughts for the first time. Some psychologists and linguists would likely remain skeptical of her family's hopeful discovery, precisely because of assumptions about what speaking actors look like. But these assumptions guide the interpretations of FC advocates as well. Unable to recognize a distributed form of linguistic agency, they instead typically cling to belief that there exist internal levels of "hidden competence" in impaired individuals, including concealed forms of literacy.

For PECS users, some of whom may carry a book of symbols with them their whole lives, questions of linguistic competence remain. In some ways, however, the attribution of participant roles can never be taken for granted in a speech event (see Goffman 1981; Irvine 1996). Speech devices may complicate, in their own ways, the figuration of a speaker, but the absence of external equipment does not change this. The practical struggles of people on the autistic spectrum merely restage the path of all would be symbolic actants. One could argue that it is the struggle for communication, not its naturalness that makes people on the spectrum so human. As Charles Goodwin writes, discussing a man with impaired speech following a stroke: "such a task, which mobilizes language, gesture and social organization for the accomplishment of action within consequential settings, sits at the very center of what it means to be human" (2000:95). It is not so strange for the "voice" of PECS' books to contain traces of the agency of others. Rather than a reflection of an impaired subject, this could be understood as an invitation to others to recognize the distributed competence of the book's owner, and engage with them in a shared form of discourse both can securely possess (cf. Goodwin 2004).

In Charlie's case, PECS has formed an ideal complement to the home sign system he has developed, in its focus on minimal distinctions and multisensory engagement. The ideological separation—articulated by both parents and carers—between PECS and "real speech" threatens to disavow the active contribution that people on the autistic spectrum make to the process of PECS interaction and to the encompassing totality of semiotic engagements through their home signing. One of the reasons PECS can be successful is that it builds on the kinds of corporeal, objectual interaction people like Charlie feel more comfortable initiating (cf. Ochs et al. 2005). Unlike words, picture symbols can be grasped in hand and studied. Unlike the beguiling, fleshy voices of neurotypical people, PECS folders are

detachable: they can be carried, set aside, safely stored away, or even replaced entirely by newer models.

## CONCLUSION

The human is identifiable, but not definable. [Pepperell 1995:182]

I have argued that one productive way to explore staged moments of human–nonhuman encounter is to examine the problem of linguistic technics, of actors being equipped and equipping others to speak. Acknowledging that all human beings find speech through the mediation of linguistic equipment is not to disregard the corporeal and cognitive resources that make human communication possible, impaired or otherwise, or that make nonhuman communication different. Rather, it is to recognize that even equipment such as this is not “naturally occurring,” insofar as claims of “naturalness” or “humanness” presuppose a dehistoricized and totalized body, always already fully human (Axel 2006). According to Derrida, interrogating the divide between human and animal is “less a matter of asking whether one has the right to refuse the animal such and such a power . . . than of asking whether what calls itself human has the right to rigorously attribute to man . . . what he refuses the animal, and whether he can ever possess the pure, rigorous, indivisible concept, as such, of that attribution” (2003:137–138). As Tim Ingold writes, “every being emerges, with its particular form, dispositions and capacities, as a locus of growth” consequently, “one cannot . . . lay down the form a being will take independently of the circumstances of its life in the world” (2000:108–109). Often, nonverbal children with autism spectrum conditions begin to develop normal speech, but gradually lose these words and “regress” into nonverbal toddlers. The idea that their rise to linguistic competence is socially or genetically assured is a harmful delusion. Brains and bodies do not arrive fully formed, human or otherwise, they become enfolded and enskilled over the course of their growth.

One reason that cybernetics and behaviorism have influenced those who seek to reshape linguistic capacities is that they provide models for simplifying and intervening in the learning processes (and, hence, the growth) of both nonhumans and humans. I have argued that the ways in which linguistic equipment is seen to extend or impugn the agency of various actors is mediated by prominent semiotic ideologies, background assumptions about what kinds of linguistic actors and actions are admissible.<sup>10</sup> My use of “equipment” is meant to complicate particular understandings of technological prostheses as lifeless extensions of communicative intentions, housed in individual speaking bodies. This understanding of equipment and the concerns it gives rise to are rooted in the particular telecommunication technologies and associated mechanistic epistemologies that took hold in the 1940s and 50s as Euro-American governments concluded one world war and prepared for another. In other places and times, it may not be impaired or incomplete subjects, but

otherworldly beings equipped to speak, whose limited uses of speech actually mark them as all the more powerful.<sup>11</sup>

In anthropology, the naturally speaking subject finds expression in the caricature of “man” as the symbolic species, the meaning-making ape. Where humans are characterized in this way, questions of nonhuman–human characteristics gain more importance and flirting with, demonstrating, and crossing this boundary become powerful gestures. Representing the abstract human is a partial and contestable performance and it involves an ensemble of relations that includes nonhumans. Indeed, there could be no definitive “humanity” outside of staged encounters with the nonhumans that surround us, in constitutive relation to whom “the human” is technically revealed, made fleetingly apparent. However, as these examples of “unnatural” language learning illustrate, this does not necessarily constitute some kind of posthuman break. Perhaps the image of the spectrum is a more appropriate one, with new attempts to establish the distinctiveness of human beings leading to fresh separations between them, not only in terms of whether or not they can speak but also whether they have the wherewithal—and can face the risk—of “giving voice” to others.

Unnatural language trials can be staged in such a way that they promote models of the naturally communicating human, a cultural figure most closely identifiable with the exceptional language teacher. Whether in the case of Koko and Kanzi’s world-renowned human companions, or the parents desperate to give expression to their disabled children’s hidden voices, those responsible for designing linguistic equipment often seem to overshadow their impaired interlocutors, who become mere extensions of their only too human communicative will. Even though “anti-internalist” behaviorist and cybernetic epistemologies test the limits of semiotic boundaries, in practice they also may reassert the human as the true origin and agent of communication. Training unnatural language learners to communicate is taken as a sign of the adeptness with which naturally speaking subjects throw their own voices. Indeed, in the moments under consideration, occasions of “success” are regularly interpreted as having amplified the linguistic prowess of the language learner’s competent interlocutors, whose natural linguistic skill appears to contaminate the trial.

Similarly, according to speech and language teachers, one of the most common mistakes made by parents employing PECS, is the use of too many words, to incorporate praise or larger sentences and then take the learner’s completion of the goal-oriented task as evidence for greater linguistic competence. PECS is thought to work by training learner and teacher to reduce their interactions to basic components. There are, however, innumerable ways of imagining scaled-down semiosis. The behaviorist epistemology behind PECS insists on breaking interactions down into basic, reciprocal actions. The only word spoken is the name of the motivator; the only gesture is the delivery of the appropriate symbol. PECS trainers advise parents to “reduce their language,” or risk their more advanced linguistic capabilities

dominating and distorting the learning process. If forms of assistive communication can sometimes raise anxieties, it is precisely because of this paradox—that methods of increasing communicability between actors may appear to widen the gulf between them. And yet, arguably things like PECS are more successful the less that they are made subservient to a rigid model of what counts as a speaking actor. The dispositions of teachers cannot be ignored, but neither should their agency be overemphasized at the expense of that of learners, if the latter are to establish their own path toward communicative growth.

In his discussion of “ego-affirming agency,” Alessandro Duranti (2005) describes the minimal conditions within which the performance of agency through language can be recognized. At the most basic level:

when we hear the sounds produced by an individual (or group) well enough to know that a language is being used but not distinctly enough to identify the words that are being uttered or even the specific language that is spoken . . . we grant the speaker the performance of a certain type of self-assertion. [2005:455]

This recognition goes beyond the mere copresence of a person, he argues, there is something distinct about linguistically mediated presence that asserts a kind of zero degree agency (2005:456). The question that linguistic equipment raises is this: what are we to make of signs we encounter that do not clearly constitute “a language”? In certain circumstances, technically mediated speech suggests communication that is both too sophisticated to be mere animal signaling but also too mediated, too dependent on other people and objects, to affirm the ego of the communicator as do the sounds in an encounter with an alien language. One alternative is to recognize a form of semiotic agency, broader in the sense that it can encompass other forms of nonlinguistic communication and take seriously the contributions of impaired interlocutors to meaningful encounters. But this is an admittedly problematic solution, one that expands the capacity of communicative action potentially well beyond the human. To do otherwise, however, is to potentially misrecognize the creative ways in which “unnatural” language learners incorporate “external” linguistic equipment, including those around them, into effective home signing systems.

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## NOTES

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1. Even for high-functioning people on the autism spectrum, linguistic delays are common and persistent difficulties with the pragmatics of language use may occur throughout their lives (Ochs and Solomon 2004).
2. To be clear, the only parallel I am describing between the medically deaf and people on the autistic spectrum is that their impairments may, in certain circumstances, create relative communicative insularity.
3. In fact, studies of abnormal linguistic development can just as easily be used to validate internalist theories of exceptional individual neurocognition (see Thomas and Karmiloff-Smith 2005).
4. Advocates of animal liberation have, at times, compared the lives of disabled humans with nonhumans by analogy, as if the former were closer to animals than people (see Groce and Marks 2000). Instead, I compare technical linguistic trials involving both to highlight the interlocking histories and “systems of domination” that include humans and nonhumans alike (see Adams 1995:83–84).
5. Behaviorism and cybernetics resemble the twin dangers of empiricism and physicalism that Kant sought to avoid in his critiques, insofar as their reduction of human beings to either a bundle of sensations or a machine process, respectively, potentially denies freedom and responsibility. Here, too, mechanistic strands were seen to pose posthuman risks: “Valuation, obligation, validity of thought, freedom—these were the kind of minimal equipment, for Kant, which needed to be saved from the encroachment of the mechanical world if we were to remain human” (Gellner 1974: 188).
6. The Turing Test was actually based on an older parlor game that involved guessing the gender of interlocutors, and which was similarly “predicated upon reducing sociality to a textual form” (Boellstorff 2008: 140). Insofar as the game required doors, separate rooms and hand written notes, it also played upon the uncertain authorship of technically mediated communication.
7. In a sense, Strathern is describing the obverse of the “dividual” in her earlier work (see 1988)—a person divided by different obligations and substances may also be regarded, from another perspective, as a person multiplied, made many.
8. Moser and Law (2001) discuss the technical mediation of voice in their analysis of “Rolltalk,” an assistive technology for people with advanced ALS and other physical impairments. But their attempt to avoid making distinctions between verbal and nonverbal acts potentially limits awareness of how such ideologically mediated distinctions shape disabled people’s interactions.
9. The manipulation of combinations of lexigrams is important, precisely because symbolic associations are motivated by logical relationships between sign tokens and only rarely by

relationships between signs and the world of rewards and objects (Deacon 1997:79–92).

10. There are other ways of evoking such tensions surrounding disembodied voice, as in Steven Connor's (2000) revealing history of ventriloquism; prosthetic speech can just as easily inspire laughter and horror, as anxieties and disagreements.
11. One interesting example is the Thunder Bird that Hallowell describes among the Ojibwa of Manitoba, which can only manifest itself through dreams and thunder claps, and whose speech only some can hear (Ingold 2000:104–106).

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## **Query**

**Q1 EDITOR:** Author says copyright is now with the author, no longer MSU.